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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/719,280	11/21/2003	Yuanning Chen	TI-35022.1	3187

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EXAMINER

CHEN, JACK S J

ART UNIT	PAPER NUMBER
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2813

DATE MAILED: 10/18/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/719,280

Applicant(s)

CHEN ET AL.

Examiner

Jack Chen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 03 August 2004.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 3 and 9-11 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 3 and 9-11 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
- 1) ☐ Certified copies of the priority documents have been received.
  - 2) ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |                                                                                         |                                                                             |
|-----------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)             | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____                                                |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____                                                             | 6) <input type="checkbox"/> Other: _____                                    |

### DETAILED ACTION

In response to the communication filed on August 3, 2004, claims 3, 9-11 are active in this application. Claims 1-2 and 4-7 were cancelled (see preliminary amendment dated on November 21, 2003).

#### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 3 and 9 are rejected under 35 U.S.C. 102(e) as being anticipated by Wang et al., U.S./6,713,357 B1.

Wang et al. Disclose an IC comprises a NMOS transistor (see abstract section, CMOS includes both PMOS and NMOS; also see col. 6, lines 17-25), said NMOS transistor having a gate oxide 5 (fig. 1B), a lightly doped drain 7/8 coupled to said gate oxide (fig. 1B), and a cap layer 10 coupled to a majority of a top surface of said lightly doped drain but separated from said gate oxide (fig. 1B), said cap layer comprised of a high dielectric constant material (fig. 1B; col. 6, lines 46-50), see figs. 1A-4 and cols. 1-12 for more details.

3. Claims 3 and 9 are rejected under 35 U.S.C. 102(e) as being anticipated by En et al., U.S./6,764,966 B1.

En et al. Disclose an IC comprises a NMOS transistor (col. 5, lines 50-65), said NMOS transistor having a gate oxide 20 (fig. 1), a lightly doped drain 14/16 coupled to said gate oxide

(fig. 1), and a cap layer 28 coupled to a majority of a top surface of said lightly doped drain but separated from said gate oxide (fig. 1), said cap layer comprised of a high dielectric constant material (fig. 1), see figs. 1-13 and cols. 1-14 for more details.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wang et al., U.S./6,713,357 B1 in view of Xiang et al., U.S./6,657,267 B1.

Wang et al. Disclosed above in paragraph 2, and in particular Col. 6, lines 45-48 shows using any high-k dielectric material for the conformal/cap layer 10 (i.e., with k greater than 3.9). Although Wang et al. does not explicitly state using hafnium silicon oxynitride as the conformal/cap layer in the related text, it appears that using hafnium silicon oxynitride as the

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conformal/cap layer is Prima Facie obvious over Wang et al since the hafnium silicon oxynitride having a dielectric constant greater than 3.9. Furthermore, Xiang et al. also teach a semiconductor device having hafnium silicon oxynitride as the high-k dielectric material (see cols. 5-6, table 1), see figs. 1-3C and cols. 1-10 for more details.

7. Claims 10 and 11 rejected under 35 U.S.C. 103(a) as being unpatentable over En et al., U.S./6,764,966 B1.

En et al. Disclosed above in paragraph 3, and in particular col. 6, lines 58-67 shows one of the available high-k dielectric material is hafnium silicon oxynitride having K value of about 16, and col. 7, table 1 shows the K values for other high-k dielectric materials and the dielectric constant of the graded dielectric constant spacers decreases in a direction away from the sidewalls of the dielectric layer (i.e., see abstract section). Although En et al. does not explicitly state using hafnium silicon oxynitride for layer 28 (fig. 1) in the related text, it appears that using hafnium silicon oxynitride for layer 28 is Prima Facie obvious over En et al since one could use any available high-k materials (i.e., using any one of the high-k materials having dielectric constant greater than hafnium silicon oxynitride) for layer 26.

### ***Response to Arguments***

8. Applicant's arguments with respect to claims 3 and 9-11 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jack Chen whose telephone number is (571)272-1689. The examiner can normally be reached on Monday-Friday (9:00am-6:30pm) alternate Monday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl W Whitehead can be reached on (571)272-1702. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jack Chen  
Primary Examiner  
Art Unit 2813

October 15, 2004